

Public Health Surveillance in Child-Care Settings

DONNA F. STROUP, PhD, MSc
STEPHEN B. THACKER, MD, MSc

The authors are with the Epidemiology Program Office (EPO), Centers for Disease Control and Prevention (CDC). Dr. Stroup is Director, Division of Surveillance and Epidemiology, and Dr. Thacker is Director of the EPO.

Tearsheet requests to Donna F. Stroup, PhD, MSc, Epidemiology Program Office, CDC (MS C08), 1600 Clifton Rd., NE, Atlanta, GA 30333, tel. 404-639-0080, FAX 404-639-1546.

Synopsis

To investigate the potential contribution of public health surveillance systems to the health of children and workers in out-of-home child-care settings, we review existing public health surveillance practice in

the United States. We identify issues that are of particular concern for surveillance in child-care settings. We propose a framework for developing public health surveillance systems that uses sentinel child-care sites, notifiable disease surveillance, modification of existing surveillance systems, and population surveys.

Successful surveillance in these settings depends on the active participation of child-care providers, public health practitioners, and clinicians in (a) the selection of high priority diseases and injuries for surveillance; (b) the development of practical case definitions; (c) the augmentation of current surveillance systems to include disease and injury related to child care; and (d) the implementation, assessment, dissemination, and evaluation of new approaches for surveillance in child-care settings.

MAJOR SOCIAL, DEMOGRAPHIC, and economic changes have resulted in about 90 percent of families with preschool children using some sort of out-of-home child-care service (1). With this prevalence of exposure in a setting, the hazards and opportunities associated with child care have become major public health concerns. While States regulate child care to prevent disease and injury, these efforts may not be well evaluated or monitored, and most common illnesses and injuries for which children are at risk are not reported to local public health authorities (2).

In this paper we argue that important gaps exist in public health surveillance in child-care settings, give examples of other surveillance models that may be applicable, recommend approaches to establishing surveillance in the child-care setting, and discuss practical aspects of these approaches. The use of public health surveillance in child-care settings can benefit the health and well-being of children and care givers in the setting as well as in the community.

Rationale for Surveillance

Public health surveillance is the ongoing, systematic collection, analysis, and interpretation of outcome-specific data, closely integrated with the timely dissemination of these data to those responsible for

preventing and controlling disease or injury (3,4). One-time community surveys or sporadic epidemiologic studies are vital to public health, but they are different from surveillance. Surveillance data must be useful to the public health professionals who work with this information routinely, as well as to clinicians, policy makers, child-care providers, and others involved with planning and decision making for the health of both individuals and communities (5).

For most children, the opportunities provided in out-of-home care outweigh the risks, and for many families child care is a necessity rather than a choice. Thus, it is incumbent upon the public health system to consider the unique challenges offered by child-care settings which surveillance can address.

First, the circumstances of out-of-home child care increase the risk of transmitting some infectious diseases to children, their families, and child-care providers. The estimated increased risk among children attending out-of-home child care (compared with children receiving care at home) is approximately 1.6 to 3.5 for diarrhea incidence (1) and 1.5 for otitis media (6). Second, the potential for spread of infection from the child-care setting to the community is substantial (7-9). Child-care settings could provide an early warning system for outbreaks

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or clusters of disease or injury in communities (for example, a single case of measles or child abuse) and may thus be more efficient than community-wide surveillance (10).

Third, surveillance data can be used to test and monitor the effectiveness of health promotion and intervention strategies developed for the child-care environment. Although many studies have been done on disease and injury prevention in out-of-home child care, few have been instituted in a community-wide or population-based effort (2). An established surveillance system can provide historical baselines, and ongoing data collection can be used for assessing the effectiveness of community-wide interventions, such as new regulations and educational campaigns.

Fourth, the child-care setting offers tremendous potential to the public health system to enhance the system's capacity to provide services, particularly to populations that may now be medically underserved. At a time when public health agencies are faced with reduction of resources, surveillance in these settings can provide the ongoing link with public health so that education about the importance of vaccinations, injury prevention, nutrition, lead screening, dental services, and general health assessment can be integrated with training of care givers and ongoing communication from the child-care center to the family.

Existing Systems Relevant to Child Care

While health issues, including not only disease and disability, but also risk of injury and impairment of emotional and cognitive development, have important effects upon the child-care setting, child-care providers are unlikely to be familiar with traditional surveillance concepts, such as case definitions or diagnostic criteria. They may question the usefulness of public health surveillance, given other priorities in child-care settings. They are likely to be unfamiliar with reporting procedures and may have concerns

about reporting confidential information on a child's health. Finally, the specific health information necessary for a surveillance case report for a disease or injury may not be routinely available from child-care records.

In light of these concerns, sources of data currently used for surveillance first should be evaluated for utility in monitoring illness and injury occurring in child-care settings. For example, the National Notifiable Diseases Surveillance System (11,12) collects data on 40 notifiable diseases from State and Territorial surveillance systems. These data originate at the local level, where they are used to target prevention and control activities. This system could be modified to include information on cases of reportable illness and injury among those attending child-care facilities. Other approaches should be considered as well, however, since many health events for which children and care givers are at risk are not currently reportable.

In considering other approaches, an important aspect of surveillance in child care is that the focus is on the setting in which the child became ill or injured, rather than the outcome itself or the source of medical care or laboratory information. In comparable situations in public health, we have developed setting-based systems for surveillance. For example, the National Nosocomial Infection Surveillance System obtains national data for hospital-acquired infections from participating hospitals to estimate the magnitude of nosocomial infections and to monitor disease trends and antibiotic resistance (13).

Similarly, the National Electronic Injury Surveillance System collects data on product-related injuries treated in emergency rooms (14). To conduct surveillance on health events that occur in an occupational setting, the Centers for Disease Control and Prevention (CDC) has developed the Sentinel Event Notification System for Occupational Risks, a State-based network of health care providers (15). Other setting-based surveillance systems have been developed for specific purposes or occasioned by specific events. For example, during the influenza season, many States conduct surveillance for absenteeism in schools or workplaces (16).

Steps in Establishing Surveillance

A 1989 CDC study collected and analyzed reports of injuries from child-care centers in Atlanta, GA, to recommend appropriate interventions (17). The objective of this study was to document the burden and patterns of illness and injury associated with child

care. A stratified (by size) random sample of facilities was selected from the 605 child-care facilities registered with the Georgia Department of Human Resources in 1987 and, of the 80 facilities so chosen, 71 (88.8 percent) chose to participate in the study. We describe this study to illustrate the steps involved in establishing surveillance for illness and injury in child-care settings.

Defining events for surveillance. In determining the events to be monitored, the magnitude of the problems associated with illness and injury should be examined in collaboration with the data provider. Surveillance systems, then, must be developed to meet local needs, and a limited number of specific outcomes should be selected. For each outcome, a practical case definition should be developed. Sacks and coworkers (17) cited the increasing number of children receiving full- or part-time child care outside the home and the lack of data regarding injuries, a major cause of childhood morbidity and mortality, as reasons for the Atlanta study. A reportable injury was defined as one acquired at the child-care center "severe enough to require medical or dental attention within 48 hours."

Collection. For each reportable event, the amount of information to be reported must address the requirement for timely reporting before the need for data to generate further study. For example, if the reported data are taken from those used for child-care management and evaluation, the surveillance activity may be helpful to the child-care provider. For the Atlanta study, each case report was limited to information about the child's age and sex, as well as the circumstances and nature of each injury. Age-specific census figures were obtained at 6-month intervals. To increase the usefulness of the data to the providers, such information could be augmented by information from physicians' offices or household surveys (18).

The utility of data on health events in child-care settings may vary by the level at which the surveillance is conducted, whether national, State, or local. For example, the timeliness of data for the detection and control of emergent health problems and epidemics might be most important at the local level. Research, on the other hand, is more often stimulated by data from State and national surveillance systems.

Time frame for reporting. To be useful, surveillance data must be reported at regular intervals, determined by the purpose of the system (5). The Atlanta injury

study received reports monthly. For acute infections, on the other hand, more frequent (even immediate) reporting is desirable.

Analysis. The analysis of surveillance data from child-care settings must include attention to specific issues. For example, the unit of analysis must be specified: child, facility, or category of facility. Also, person-time at risk should be estimated for many surveillance purposes. The Atlanta study used child-hours of attendance from a recent national telephone survey (19), while others have used alternative estimates, such as child-days (20) or child-years (21).

Dissemination. An important component of the surveillance process is the dissemination of information not only to public health practitioners and policy makers but also back to child-care providers, clinicians, and parents. The Atlanta child-care injury study supplied a report to child-care providers documenting hazardous equipment or facilities and days and times of high risk (22).

Practical considerations. Several specific considerations must be addressed before successful implementation of surveillance in a child-care setting is practical. First, analytic issues, logistic and administrative problems, and importance of demonstrating the usefulness of the surveillance activity to the data provider must be recognized. Second, the heterogeneity of child-care settings, ranging in size from family homes taking care of 2 or 3 children to large centers taking care of more than 200 children (23), will require creativity in surveillance methods beyond the traditional disease-specific approach. For example, simply having the provider report to the health department when absenteeism exceeds a predetermined threshold or the existence of a single case of a sentinel event (for example, measles) may provide sufficient information to detect emergent health problems.

Third, because State and community licensing requirements typically do not include all forms of child care, a "list" of reporting sites does not exist for child care as it does for other surveillance systems (such as the list of all State health departments for the National Notifiable Diseases Surveillance System or the list of hospitals in the sample participating in the National Nosocomial Infections Surveillance System). Without a list of reporting sites, identification of the universe at risk is difficult.

Further, the link between health care professionals and the public health system is different from that between child-care providers and the public health

Proposed Data Collection Form for Surveillance in Child-Care Settings

Please contact the health department any time you have:

- 1) more than 20% of children absent for 2 consecutive days;
- 2) a suspected case of child abuse; or
- 3) a single case of any of the following diseases in a child or child-care worker: bloody diarrhea, hepatitis A, measles, meningitis, rubella, pertussis.

In addition, please submit the following form each month.

Month/Year of Report _____ IDNUM _____

Average daily census this month _____

For this month, please list number of episodes of each of the following:

Health event	In children	In care givers
Injured at child-care site and required physician visit	_____	_____
Absent due to respiratory illness (sore throat, stuffy nose)	_____	_____
Absent due to middle ear infection	_____	_____
Absent due to diarrhea, vomiting, or upset stomach	_____	_____

system. Finally, (with the exception of suspected child abuse) many of the common illnesses and injuries for which children are at risk are not reportable to public health authorities (7), and frequently more information is needed than can be provided routinely. For example, group A streptococcal disease is highly transmissible in a child-care setting; however, the disease may be transmitted before symptoms appear, and the diagnosis must be confirmed by culture (24).

Although the Atlanta project illustrates the basic elements of surveillance in a child-care setting, investigators found several barriers to routine sur-

veillance practice: the study used more resources than could be practical in most settings, participation among data providers was difficult to maintain, and concern with confidentiality of the data precluded routine analysis and dissemination (22).

These practical concerns are highlighted by the experience of a county health department in Washington. In 1992, in collaboration with CDC, the health department began to establish surveillance systems for infectious diseases and injuries in child-care settings (25,26). The goals of this project were to determine demographic characteristics of child-care settings; to establish an active surveillance system for a geographically defined population for infectious diseases and injuries in child-care settings; to assess risk factors for illness and injury in child-care facilities; to develop, implement, and evaluate specific prevention and intervention strategies to reduce the transmission of infectious diseases and occurrence of injuries in child-care settings; and to develop methods to assess economic and other impacts of disease and injury in child-care settings.

Two hundred child-care programs (selected using a random sample stratified by size of all licensed facilities caring for more than five children) were contacted by a letter and a personal visit with the care giver or director of the facility. Of these, 125 programs ranging in capacity from 1 to 175 children chose to participate. Public health nurses conducted assessments of child-care environments to note any potential for increased risk of disease or injury. Data collection included minimal information on signs and symptoms in terms familiar to care givers; more detailed information (including diagnoses, causes of illnesses or injuries, and medical followup) was collected during weekly contacts.

Generally for the Washington project, family child-care homes found it much easier to incorporate the surveillance system into their program than child-care centers, perhaps because of the relatively larger number of children or a perceived breach of confidentiality by the centers' managers. Experience during the first year of these projects has highlighted the importance of the interactions of health care professionals with parents and child-care professionals in the utility and quality of data collected in the surveillance system.

Discussion

The increased risk of infectious diseases, such as hepatitis A, *Hemophilus influenza*, and otitis media (6) in child-care settings has resulted in recommendations to reduce risk (27). Current developments in

health reform and automated medical records provide an exciting opportunity to initiate surveillance for illness and injury acquired in child-care settings. Despite the relatively larger health burden of infectious conditions, the surveillance of injuries in child-care settings has received more attention in the literature. Perhaps this emphasis is due to the acute nature of the injury which requires the care giver's immediate attention (as opposed to an infectious conditions, which usually leads to a call to the parents).

Surveillance in child-care settings requires a creative and multi-pronged approach. First, existing surveillance systems should be modified to include information for child-care attendance for all preschool children with selected diseases. For example, the National Notifiable Diseases Surveillance System currently contains information for infectious diseases of children; "child-care-related illness and injury beyond a predetermined threshold" could be added to the list of conditions reportable to State and local health departments, or "child-care setting attendance" could be added to the case reports of selected conditions. Clinicians could be educated to request such information, and resulting information could be used to identify emergent conditions and target intervention efforts.

Second, national surveys, such as the Behavioral Risk Factor Surveillance System (18) or the National Health Interview Survey (28), could be modified to include information for child-care related illness and injury, immunization status of children, or use of other preventive interventions. Finally, sentinel child-care sites could be selected as representative of the population for such characteristics as geography, socioeconomic status, race or ethnicity, and type of child-care provider. Although reporting from these sentinel sites would not necessarily contain clinical or laboratory diagnoses, such simple information as absenteeism or a sentinel event could trigger a public health investigation. More detailed information, such as visits to a physician for an injury, diarrhea, or respiratory illness, could be used to monitor trends or to target interventions. A sample data collection form is shown in the box on page 122.

Data from surveillance in child-care settings must be useful to the child-care provider, in addition to the public health agency. First, use of the data within the setting could provide earlier opportunities for intervention to improve the health and well-being of the children. Second, since most child-care facilities operate as small businesses with limited managerial expertise, the surveillance system might facilitate the administrative practices of child-care providers, with

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the use of microcomputer systems (29). In addition, surveillance may assist the child-care provider in providing data to address the growing need for liability insurance.

Experience in the Washington project has shown that ongoing interaction with health authorities provides opportunities for obtaining information and gaining access to training and other capacity-enhancing activities. Contact with the health department resulting from participation in the surveillance system may be the most immediate reward to child-care providers. Such contact may enhance public health outreach and service delivery and enhance capacity for decision making regarding the delivery of necessary public health and prevention services.

We recommend that the public health community aggressively address the lack of surveillance for illness and injury in child-care settings. For example, high-priority conditions should be selected for surveillance. We give examples of such conditions in the box; however, the list of conditions should be developed collaboratively, involving public health staff, child-care workers, and clinical practitioners. One approach to setting priorities for infectious diseases in child-care could be to characterize diseases by principal modes of transmission (for example, airborne, person-to-person) and provide an estimate of the relative burden of these conditions (2), which can be used to rank conditions for consideration. Second, once a list of conditions is agreed upon, practical case definitions should be developed, such as those used in the Atlanta child-care injury study.

Third, national surveillance should be initiated by augmenting existing systems such as the National Health Interview Survey or the National Notifiable Diseases Surveillance System for selected issues. This step will yield the national data needed to determine the scope of the problem and to evaluate interventions, while the local basis of the National Notifiable Diseases System will provide the data needed for prompt intervention and prevention activities. Fourth,

pilot programs (such as that in Washington) should be established to develop effective models for local surveillance of illness and injury related to child care. Finally, models of successful surveillance at State and local levels must be disseminated, so that these can be applied with minimal developmental cost.

We recognize that, to be successful, any surveillance effort must have clear goals, must be acceptable to providers, and must provide daily tangible benefits. The ultimate success of surveillance in child-care settings will depend on societal recognition of the impact of out-of-home child care on the health and safety of children, their care givers, and their community.

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